

## REVISITING FALSE MEMORIES AS A VEHICLE FOR PSI

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## ABSTRACT

It has been suggested (Blackmore & Rose, 1997) that experimental manipulations that encourage the generation of false memories may provide a promising medium for generating or detecting ESP. The present study was intended to replicate this original effect with an improved method and a larger sample size. Ninety-eight participants were presented with 32 word stimuli via PC; 16 of these were illustrated with pictures whereas the other 16 were not, and instead participants had to imagine an appropriate picture. Half of the words were for concrete objects and half were for abstract concepts. A week later participants completed measures of paranormal belief and transliminality and were then given a surprise recognition task in which they had to identify which words had been presented with pictures and which they had only imagined pictures for. Attached to the response sheet was an envelope containing images for some of the to-be-imagined words, which constituted targets for a hidden psi task. Participants generated 416 false memories, in which they reported having seen a picture that they had in fact been asked to imagine. Of these, 212 were for target pictures and 204 for control pictures, and overall performance was not better than chance expectation ( $t = 0.81$ ,  $p = 0.42$ ). There was no evidence to suggest that high scorers on measures of belief in the paranormal or transliminality were more likely than low scorers to produce false memories *per se*, or to produce them for target pictures over controls. The author concludes that although intuitively plausible, there is no empirical support for the suggestion that the process of inducing false memories can provide a fruitful medium for studying ESP.

## INTRODUCTION

There is some evidence to suggest that psychological states in which there is potential for confusion between imagination and reality may be psi-conducive. Certainly experimental procedures that induce a hypnagogia-like state (which can be characterised as encouraging such confusions; see Mavromatis, 1987), such as dream ESP and the ganzfeld protocol, have had some success in eliciting psi (see, for example, Dalton, Steinkamp & Sherwood, 1999, and Parker, 2001, respectively). More recent survey work conducted at University College Northampton (e.g. Simmonds & Roe, 2000) suggests that individuals who score high on measures of schizotypy, whom we have characterised as having greater potential for reality–imagination confusions, do tend to have higher levels of belief and report greater incidences of ostensible psi than do those who score lower on this measure. Related concepts of transliminality (Thalbourne, 2000) and thinness of boundaries (Hartmann, 1991) have also given encouragement to the notion that such personality or cognitive styles may be psi-conducive.

Of course, this relationship may be interpreted in two ways, either reflecting what Blackmore and Rose (1997) define as the ‘misinterpretation hypothesis’, in which those prone to reality–imagination confusions may simply mislabel imaginal events as real, or what they term the ‘reality–imagination psi hypothesis’ in which such reality–imagination confusions may actually be psi-

conducive in some way. In support of this second hypothesis, there is some indication that reality–imagination confusers such as high-scoring schizotypes (Lawrence & Woodley, 1998; Simmonds, 2002) and transliminals (Storm & Thalbourne, 1998–1999) may perform better at psi tasks.

Blackmore and Rose (1997) have suggested a method by which reality–imagination confusions can be induced in such a way as to enable them to see whether this could act as a vehicle for psi. In this study, 33 participants were presented via projector with a series of 12 stimuli, some of which were pictures of household objects along with their names and some of which were only the names of such objects and for which participants were to *imagine* a picture of the object. Half of the stimuli were presented once and half repeated three times. The rationale for this is not clear, beyond that it was “in order to further confuse the subjects” (p.327). Thus participants experienced 24 presentations in total. Each stimulus was presented for 10 seconds. In subsequent sessions, Blackmore and Rose (1997) included interim activities that prompted participants to think about the target objects in a manner that did not distinguish between presented and imagined objects (e.g. producing drawings or answering questions of the type ‘Did the shoe have laces?’). Finally participants were provided with a list of the objects that were either presented as images or as labels only, along with a further set of 12 distractor objects, and were asked to record whether the object had been seen, imagined or not presented at all. Unknown to the participant, an envelope stapled to the response sheet included pictures of half of the imagined objects in the hope that these objects (denoted the ‘targets’) would be more likely to give rise to false memories than those not included (the ‘decoys’). This constituted a covert psi task since participants were not told that there would be such an ESP element.

Blackmore and Rose found that participants falsely remembered that some of the objects had been presented to them when in fact they had only been asked to imagine them. They failed to find evidence of a correlation between level of paranormal belief and number of false memories generated ( $r = 0.05$ ,  $p = 0.80$ ), contrary to the misinterpretation hypothesis. However, false memories were significantly more likely for target objects than for control objects ( $p = 0.03$ , 2-tail), in accordance with the reality–imagination psi hypothesis. We should be cautious in our interpretation of this finding, though, since only nine of the 33 participants produced any false memories at all, and these analyses are based on only 18 false memories in total (an average of 0.54 per person), of which 12 were for target images and 6 for control images. This is hardly an overwhelming effect. Surprisingly Blackmore and Rose did not look to see whether paranormal believers and disbelievers differed in terms of their psi performance; given previous evidence for a modest but fairly robust sheep-goat effect in ESP research (Lawrence, 1993), we might have expected to find differences here.

Subsequent replications by Rose and Blackmore (2001) have been unsuccessful. Study 1 in this series was an exact replication with a slightly larger sample of 48 participants. Again, however, the manipulation was relatively unsuccessful, with only 13 of the 48 participants producing any false memories. Altogether they gave just 19 false memories (an average of only 0.39 per person—there were actually fewer false memories than false imaginings, in which participants

falsely report that an object was only imagined when in fact it had been presented), and of these 10 were for target images ('hits') and 9 for control objects ('misses'). Clearly this difference is not significant ( $p = 0.81$ ). Again no relationship with paranormal belief was found ( $r_s = -0.134$ ,  $p = 0.53$ ).

In both experiments stimuli were presented as projector slides with participants viewing them in groups. Although the order of presentation was counterbalanced across groups, there is still a concern that the presentation may give rise to primacy effects (in which certain words are more memorable by virtue of being presented earlier in the presentation series, when processing demands are lighter). Any such effect could be amplified by a stacking effect, since many participants experience the same order. Also we cannot be sure that all participants had equivalent views of stimuli (e.g. they may have had their view obscured by others). To some degree Rose and Blackmore (2001) addressed this in Study 2 of their series, since here images were presented individually via PCs, although they still only used four counterbalanced permutations. Again they found no correlation between paranormal belief and incidence of false memories ( $r_s = 0.12$ ,  $p = 0.54$ ). Unfortunately, a problem with the program meant that they could not evaluate the reality–imagination psi hypothesis. This is a pity because the design seemed quite promising, and it is disappointing to note that they reverted to their original protocol for Study 3.

Study 3 was an exact replication of Study 1 except that the 82 participants were informed that ESP was involved. Of these, 60 between them generated 148 false memories (an average of 1.8 per participant), and these were divided into 73 hits and 75 misses, which is not a significant difference ( $p = 0.83$ ). Once more, there was no correlation with scores on the paranormal belief scale ( $r_s = -0.072$ ,  $p = 0.32$ ). There was no evidence here that asking participants to imagine an object three times actually led to greater numbers of false memories than when they were to imagine the object only once. This complication therefore seems unnecessary. It may be more effective simply to increase the number of images in the target set.

Essentially this has been done by Greening (2000; Greening & Wiseman, 1999), who has reported on two extended replications. In the first of these (a pilot study), 16 participants were presented with 24 slides, 12 of photographs with labels, and 12 with a label only. Here she did not use the interim reinforcement phases, but instead simply tested recall one week later. Nevertheless, this gave rise to 45 false memories (an average of 2.8 per participant, superior to all four studies by Blackmore and Rose). Even with this increased number of false memories, there was not a significant difference between those for targets and those for controls ( $p = 0.15$ ). She did, however, discover a correlation between number of false memories and paranormal belief score ( $r = 0.53$ ,  $p = 0.047$ , 2-t). Study 2 was a replication with a larger sample, in which 54 participants gave 175 false memories (average = 3.24); again there was no difference between target and control images ( $p = 0.12$ ) but this time there was no correlation with paranormal belief either ( $r = 0.19$ ,  $p = 0.17$ , 2-t).

To date, then, there have been five studies that have explored the putative link between the generation of false memories and psi, but only one of these has found significantly better performance for target images compared with controls, as predicted by the reality–imagination psi hypothesis. Six studies

have considered whether believers in the paranormal are more likely to experience false memories *per se*, which might give circumstantial support for the misinterpretation hypothesis, and again only one has reported a significant finding. There is thus little direct evidence to support the misinterpretation hypothesis. However, it may be premature to conclude that the general thesis that reality–imagination confusions can be a vehicle for psi should be rejected, since there still remain concerns about the degree to which these particular tests constitute a sensitive and valid test of it. Given how important it is to continue to search for psi-conducive experimental conditions, especially where they may be less complex or expensive in terms of time and facilities than alternatives such as typical dream ESP or ganzfeld protocols, it may be worthwhile to attempt further refinements to the protocol.

One possible confounding factor in these studies concerns the nature of targets. Blackmore and Rose (1997) note that people interpret vividness of imagery as an indicator that a memory is accurate rather than a product of the imagination (cf. Garry, Loftus & Brown, 1994). This suggests that concrete words, which are likely to be easier to imagine vividly, may be more successful than more abstract words in eliciting false memories. However, in simple word recognition tasks (see, for example, Hirshman & Arndt, 1997; Perez-Mata, Read & Diges, 2002) researchers have typically reported a greater number of false recognitions with abstract words than with concrete words. Thus it is unclear what we might expect in the current context and this seemed worthy of investigation. I planned to include more abstract items (such as ‘justice’ and ‘religion’) in a longer stimulus list to see whether this might affect the number of false memories induced and also the degree to which the material might be psi-conducive.

Secondly, Rose and Blackmore have typically used Tobacyk’s Paranormal Belief scale (Tobacyk, 1988), which has been subject to some criticism (e.g. Lawrence, 1995) and may be regarded as more a measure of superstitiousness than paranormal beliefs pertinent to parapsychology. Indeed, in their discussion Rose and Blackmore (2001) raise the possibility that their failure to detect a relationship between belief and number of false memories may have been due to their use of an invalid measure of belief. In this study I planned to use a measure of paranormal belief (the Australian Sheep-Goat Scale, Thalbourne & Delin, 1993) that is more focused on psychic phenomena.

Thirdly, although participants in the studies reported by Rose and Blackmore (2001) completed an imagination test, and Greening used the Dissociative Experiences Scale (Carlson & Putnam, 1993), there is a need for a more direct but independent measure of potential for reality–imagination confusions. In particular, the notion of transliminality would seem especially relevant when seeking to identify individuals who are prone to difficulties in differentiating between internal and external experience (Thalbourne, 2000; Thalbourne & Houran, 2000). Therefore I planned to consider whether participants’ transliminality scores serve as a better predictor of performance on this task.

Thus the primary predictions, all of which (except the one asterisked) are conservatively two-tailed, were:–

For the misinterpretation hypothesis:–

- There will be a significant difference between concrete and abstract stimuli in terms of the number of false memories reported.
- There will be a significant difference among high, moderate and low scorers on the Australian Sheep-Goat Scale in terms of the number of false memories they report.
- There will be a significant difference among high, moderate and low scorers on the Transliminality Scale in terms of the number of false memories they report.

For the reality–imagination psi hypothesis:–

- \*There will be significantly more false memories for target objects than for control objects.
- There will be a significant difference between concrete and abstract stimuli in terms of the psi index scores elicited.
- There will be a significant difference among high, moderate and low scorers on the Australian Sheep-Goat Scale in terms of their scores on a psi index.
- There will be a significant difference among high, moderate and low scorers on the transliminality scale in terms of their scores on a psi index.

## METHOD

### *Design*

To evaluate the misinterpretation hypothesis I adopted a 3x2 factorial design looking at the effects of paranormal belief (high, moderate and low scorers) and target type (abstract and concrete) upon number of false memories generated. Similarly I planned to look at the effects of transliminality (high, moderate and low scorers) and target type (abstract and concrete) upon number of false memories generated.

To evaluate the reality–imagination psi hypothesis I adopted a 3x2 factorial design looking at the effects of paranormal belief (high, moderate, and low scorers) and target type (abstract and concrete) upon a 'psi index' derived from the proportion of false memories for target objects against proportion for control objects. Similarly I planned to look at the effects of transliminality (high, moderate and low scorers) and target type (abstract and concrete) upon psi index scores.

### *Apparatus and Materials*

A computer program was written using *Superlab Pro* that presented stimuli in a randomised order that differed for each person. Participants were presented with 32 words in total. Half of these were presented with a line illustration and half were not (see Figure 1). Two versions of the program were produced, such that the items that were illustrated in one version were presented with the word alone in the other and vice versa. Within each subset of 16 (*illustrated* or *word only*), half of the stimulus words were concrete words, such as 'apple', 'chair' and 'guitar', and half were abstract words such as 'justice', 'war' and 'love'. A full list of the words used is included as an appendix: copies of the pictures are available from the author on request. Illustrations were taken

from commercial clip art packages using no particular criteria beyond those stated above, for example the abstract words above were illustrated respectively by a pair of scales, an armed soldier and a couple holding hands surrounded by a heart symbol. A checklist was generated which listed all 32 items along with 12 further items that had not been presented at all but which were thematically related to those that had. The checklist included response options to allow participants to register whether they had originally seen the item illustrated with a picture, whether they had been asked to imagine a picture for the item, or whether the item had not been presented at all.

Two individual differences measures were used here. The first of these was the Transliminality Scale: Form B (Thalbourne, 2000), which consists of 29 items to which participants respond 'True' or 'False'. A revised (and abbreviated) version of this scale has been published (Lange, Thalbourne, Houran & Storm, 2000) of which I was not aware at the time of this study. The second measure was the Australian Sheep-Goat Scale (Thalbourne & Delin, 1993); an 18-item scale that asks about belief in and experience of phenomena such as extrasensory perception and psychokinesis. The response scale was modified (after Roe, 1998) to use a six-point Likert scale rather than the visual-analogue scale used in the original.

### *Participants*

Ninety-eight psychology undergraduates participated in the study, of whom 76 were female and 20 male (two declined to record their gender), with a mean age of 21.2 years ( $SD = 3.7$ , median = 20).

### *Procedure*

Participants completed the tasks as part of course requirements. They were initially briefed by being told that the activity they were about to engage in was concerned with the nature of visual imagery and would explore factors that might make an image more or less easy to visualise. Participants were tested in groups of 5-15, but worked individually at their own networked PC. Once initiated, the computer program autoran, and began by presenting an instruction page which read:-

In the following experiment you are required to study the items on screen as carefully as you can. When a picture appears please study the whole image thoroughly, taking account of its size and shape. When only a word appears please imagine as clearly as you can in your mind a picture that represents this word. Project that image onto the screen above the word so that it looks like one of the other picture trials. Thank you. Press the spacebar to continue.

On pressing the spacebar participants were presented with a series of items consisting of words alone and words with images, each of which appeared on screen for 10 seconds. Examples of presented and to-be-imagined items are illustrated in Figure 1. The order of presentation of items was randomised across participants to control for order effects. Two versions of the program were used, such that the items that were illustrated in one version were presented with the word alone in the other and vice versa. All participants in a particular class experienced the same version. Forty-six participants were presented with Version 1 and 52 with Version 2.

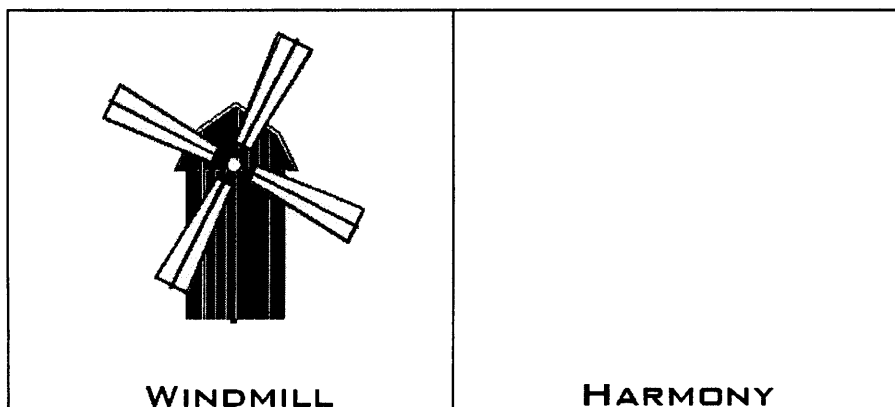


Figure 1. Examples of a presented and a to-be-imagined item.

In the following week's workshop, participants completed measures of paranormal belief and transliminality and were then given a surprise recognition task in which they had to identify words for which pictures had been presented and those for which they had only imagined pictures. They were provided with the checklist, which included the following instructions:—

Earlier you were shown a series of words. Some of the words were illustrated with pictures, but for others you were asked to imagine the word named. For each item on the following list, please tick a box to indicate whether you saw the PICTURE or just IMAGINED the word or whether the word was NOT SEEN at all.<sup>1</sup>

The sheet consisted of all the 32 words in the experiment plus another 12 thematically related dummy words. This was sellotaped to the front of an A4 manila envelope. Unbeknown to participants, each envelope contained a set of eight ESP target images drawn from the pool of 16 that they had previously been asked to imagine. Eight target sheets were generated, consisting of different permutations of items for each task version. These were not intended to be exhaustive but they were counterbalanced so that all images had an equal chance of being selected as targets. Half of the target images were for concrete words and half were for abstract words. Both flaps of the envelopes were also sealed with sellotape. On subsequent inspection, no envelopes showed any evidence of tampering.

## RESULTS

### *Data Manipulation*

Ninety-seven of the 98 participants generated at least one false memory, to give a total of 416 (an average of 4.2 per person). Responses on the Australian

<sup>1</sup> I am grateful to an anonymous reviewer for pointing out that strictly speaking participants were not asked to imagine a *word* but to imagine a *picture* to accompany a presented word. In principle this could have caused confusion and led to erroneous responses. However, in the context of the activity I am confident that participants responded appropriately; none of the 98 participants queried this response format and all reported recognising at least one imagined 'word'. In any case, the focus of this study is on false memories (falsely reporting that a picture was seen when in fact it was imagined) and not false imaginings, so that this error does not bear upon the planned analyses.

Sheep-Goat Scale were scored using a five-point Likert scale so that scores fall in the range 18 (absolute disbelief) to 90 (absolute belief). The mean belief score for this sample is 42.6 ( $SD = 12.81$ ), suggesting that this is a relatively sceptical group compared to the theoretical midpoint of 54 for the scale. The scores are reasonably normally distributed (skewness = 0.19) and thus were treated as parametric. The sample was divided into three to give low, moderate and high belief groups of approximately equal size.

The 29-item transliminality scale uses a true/false response format, with each true response being awarded a mark. Hence scores fall in the range from zero (no such beliefs or experiences) to 29 (all such beliefs or experiences). The mean score for this sample is 9.9, and again the scores are reasonably normally distributed (skewness = 0.20) and thus were treated as parametric. The sample was also divided by this measure to give low, moderate and high transliminality groups of approximately equal size.

### *The Misinterpretation Hypothesis*

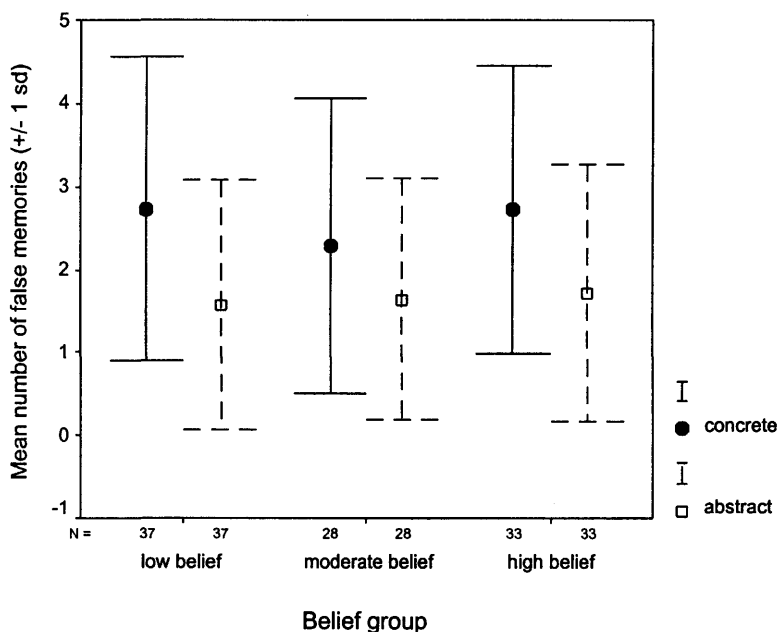


Figure 2. Mean number of false memories by belief group and word type.

Figure 2 illustrates the mean number of false memories by word type (abstract and concrete) and belief group (high, moderate and low). We can see from this that participants typically produced more false memories for concrete items (an average of 2.60 per participant) than for abstract items (1.64). There does not seem to be any obvious relationship between belief and false memory production, with values remaining relatively constant across groups. Conducting a  $2 \times 3$  ANOVA looking at word type and belief group confirms this impression, revealing that there are significant differences in the number of



false memories for abstract versus concrete words ( $F(1,95) = 16.90, p < 0.001$ ). However, there is no difference in number of false memories made by the three belief groups ( $F(2,95) = 0.37, p = 0.69$ ) nor an interaction between word type and belief ( $F(2,95) = 0.44, p = 0.65$ ).

Figure 3 illustrates the mean number of false memories by word type (abstract and concrete) and transliminality group (high, moderate and low). As with belief, there seem to be only modest differences in the numbers of false memories generated by the three transliminality groups, and these differences are not significant ( $F(2,95) = 0.56, p = 0.57$ ). There is no indication of an interaction between word type and transliminality ( $F(2,95) = 0.06, p = 0.94$ ).

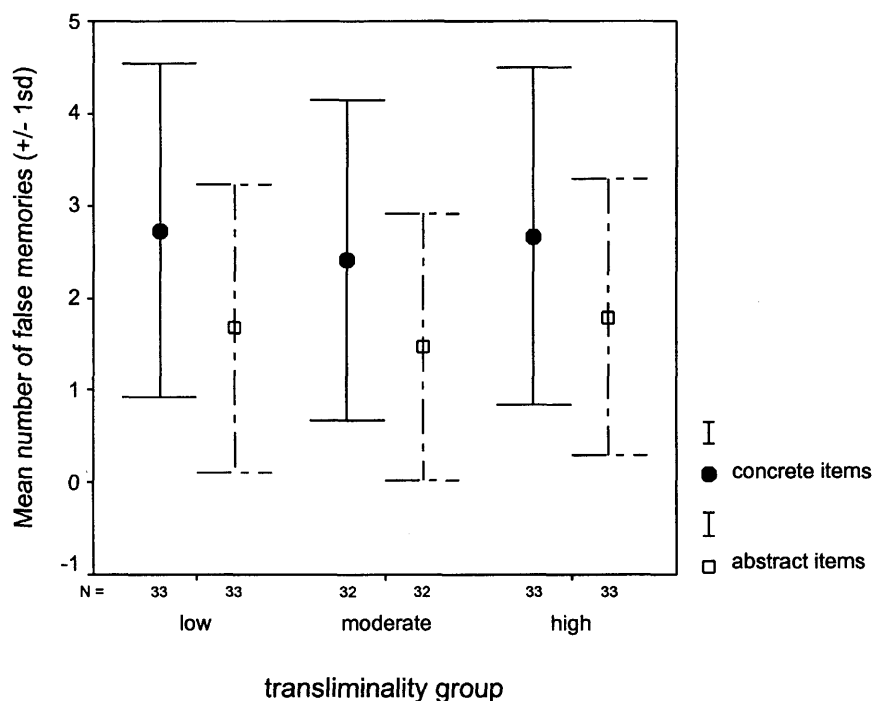


Figure 3. Mean number of false memories by transliminality group and word type.

#### *The Reality-imagination Psi Hypothesis*

A comparison was made between false memories for target images and those for control images. One participant in this study reported no false memories and so was removed from this analysis. A 'psi index' can be calculated by comparing the number of false memories for target images with the number for controls. This was done by dividing the number of false memories for target images by the total number of false memories. Since there are equal numbers of target images and controls we would expect that by chance half of all false memories will be for target images, giving an index score of 0.5. Figure 4 is a frequency histogram of index scores for all participants. We can see that although there is a slight shift in the distribution in the predicted direction

(giving a mean of 0.52,  $SD = 0.26$ ), it does not differ significantly from chance expectation (1-sample  $t = 0.81$ , 96 df,  $p = 0.42$ , 1-t).

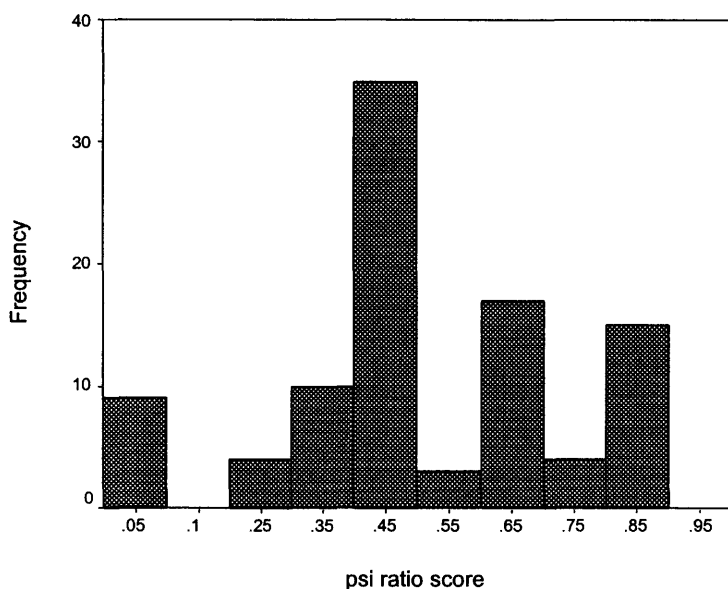


Figure 4. Frequency distribution of psi ratio scores.

Notwithstanding this overall failure to find an ESP effect, it may be worthwhile to consider whether there are individual differences in performance. Figures 5 and 6 illustrate the mean psi index scores divided by word type and, respectively, belief group and transliminality group. We can see from Figure 5 that there are some modest differences in the mean psi index scores for the low belief group (0.43 for concrete and 0.45 for abstract), the moderate belief group (0.42 and 0.51 for abstract), and the high belief group (0.58 for concrete and 0.49 for abstract). However, these are rather unsystematic, and there is clearly great variation in performance within each group. Conducting a  $2 \times 3$  ANOVA looking at word type and belief group reveals that there are no significant differences in the psi indexes for abstract versus concrete words ( $F(1,64) = 0.01$ ,  $p = 0.98$ ), nor are there differences between the three belief groups on this measure ( $F(2,64) = 0.80$ ,  $p = 0.45$ ). There is no interaction between word type and belief ( $F(2,64) = 0.55$ ,  $p = 0.58$ ). Similarly in Figure 6 that there is little evidence of differences between the low transliminality group (0.45 for concrete and 0.41 for abstract) and the moderate transliminality group (0.45 and 0.43 for abstract), but there is an interesting increase as we move to the high transliminality group (0.53 for concrete and 0.57 for abstract). Overall, however, there are no significant differences in the psi indexes for the three transliminality groups ( $F(2,64) = 1.944$ ,  $p = 0.152$ ), and no interaction between word type and transliminality ( $F(2,64) = 0.163$ ,  $p = 0.850$ ).

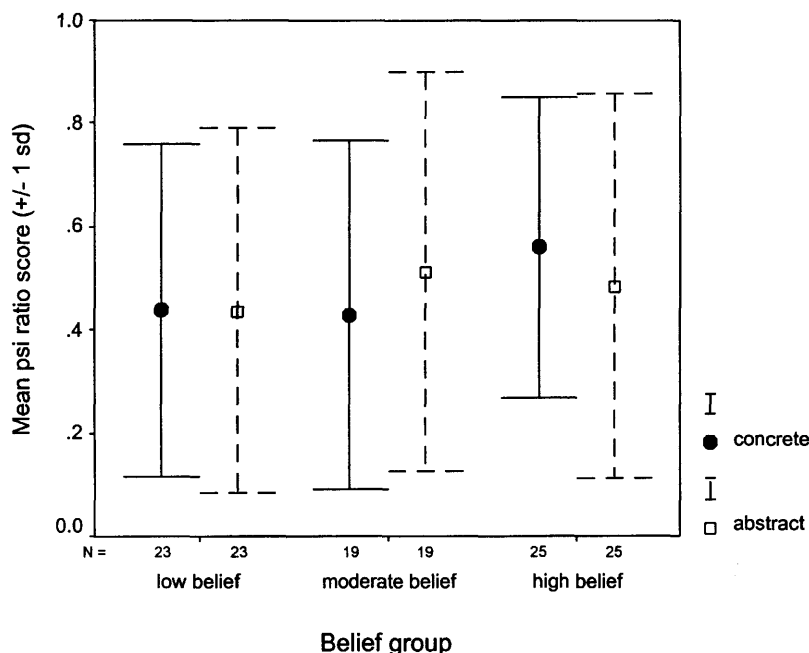


Figure 5. Mean psi ratio score by belief group and word type.

## DISCUSSION

Firstly it should be noted that the method employed here was clearly successful in inducing false memories, producing 416 in total (for an average of 4.2 per person). This is superior to any of the previous studies (Blackmore & Rose, 1997; Greening, 2000; Greening & Wiseman, 1999; Rose & Blackmore, 2001), and strongly suggests that false memories can be induced without the need for the more convoluted study designs entailing periodic interim tasks, as originally included by Blackmore and Rose.<sup>2</sup>

Having a greater amount of between-subjects variance in terms of number of false memories should in principle allow us better to detect covariation in performance as a function of scores on other measures. Nevertheless, there is no support for the misinterpretation hypothesis, with paranormal believers being no more likely than disbelievers to produce reality–imagination confusions (irrespective of whether or not the item was an ESP target). This is consistent with most previous investigations (Blackmore & Rose, 1997; Greening, 2000; Rose & Blackmore, 2001), and stands in contrast to Greening and Wiseman's (1999) finding with a small pilot sample. It seems likely, then,

<sup>2</sup> I am grateful to an anonymous reviewer for noting that Blackmore and Rose had only six target items whereas Greening had 12 and in this study I had 16, which in itself would be likely to increase the possibility of generating false memories. However, even when weighted by the number of items, the average number of false memories in Blackmore and Rose's programme of four studies is 0.145, for Greening it is 0.258 and here is 0.263.

that whatever the causes of paranormal belief, reality–imagination confusions of the type investigated here are unlikely to be implicated.

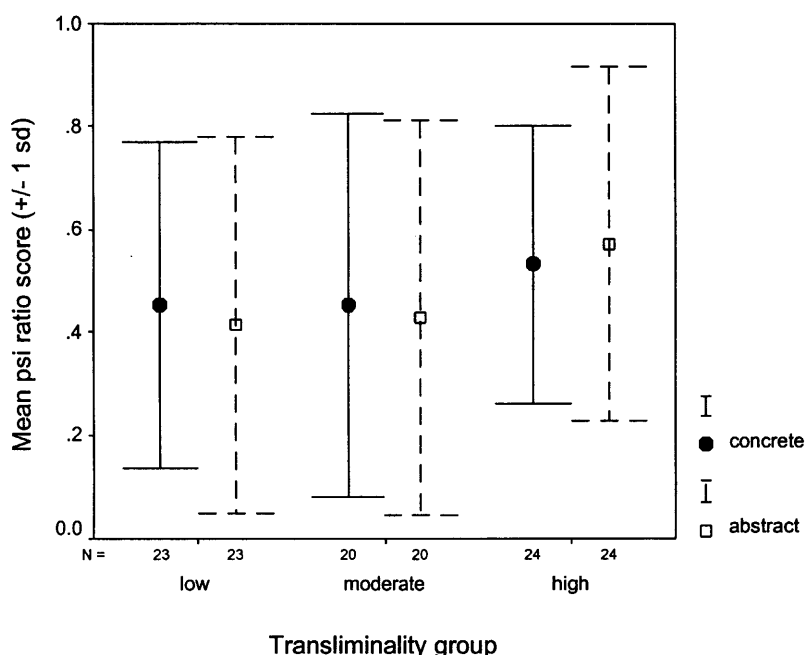


Figure 6. Mean psi ratio score by transliminality group and word type.

Interestingly, significantly more false memories were reported for concrete items compared with abstract items. This stands in contrast to the findings from research on word recognition (e.g. Hirshman & Arndt, 1997; Perez-Mata, Read & Diges, 2002). However, the finding could be explained in terms of participants being able to imagine concrete objects more vividly than abstract objects, and this vividness might have been interpreted on recall as an indication that the memory was for a perceived (i.e. an external) object rather than an imagined (internal) one (Garry, Loftus & Brown, 1994). Alternatively, as suggested by one reviewer, it may be that in order to generate a suitable imaginary object to stand for an abstract item (such as 'harmony') participants considered and rejected a number of candidates before settling on an appropriate image. This greater cognitive effort involved and the subsequent availability of more than one image when presented with the word in the recognition phase could have served as cues that would identify the word as imagined. Where the imagined word was concrete there may have been a single, 'obvious' image (e.g. for 'spider') which would make it difficult to discriminate from presented images. This interesting finding merits further investigation.

With regard to the reality–imagination psi hypothesis, there is no evidence from this study that the approach adopted represents a useful method for evoking or capturing psi. The mean psi index score approximated the null value of 0.5. This is despite my incorporating some methodological improvements

into the design and recruiting a larger sample of participants than used in previous studies, which it was felt would improve the likelihood of success should the effect be real. In mitigation we might note that the participants constituted a rather sceptical sample, so that with three equal-sized groups even the high belief group was not particularly open to the occurrence of psi (mean belief score = 57.6, where the midpoint of the scale is 54). But even if we restrict our analysis to those who gave a belief-in-paranormal score above 54 the mean psi index score is still only 0.57, and this does not differ significantly from the null of 0.5 (1-sample  $t = 1.47$ ,  $p = 0.16$ ). Thus, although the general suggestion that memory imagination confusions may be a fertile test bed for psi does seem intuitively plausible, the empirical evidence amassed to date offers a clearly pessimistic view. The only significant psi effect has been produced in a study (Blackmore & Rose, 1997) with one of the smallest samples and the lowest number of false memories, and this outcome is looking increasingly like a statistical fluke.

We might be encouraged to believe that an overall effect is simply going undetected if we could find evidence of some systematic relationship between performance and individual differences variables, but here again the tidings are not good. There were no significant between-groups differences in psi index scores when the sample was divided by belief in paranormal score or by transliminality score. It is true that others have looked for correlations rather than differences, and it may be argued that splitting the sample into three according to belief and transliminality scores might be relatively crude (although this assumes without any justification a continuous rather than discrete relationship between the variables). As a check I went on to conduct *post hoc* correlations of transliminality score against psi index for concrete and abstract words separately, but found no relationship for concrete words ( $r(91) = -0.07$ ,  $p = 0.54$ ) and only a suggestive positive correlation for abstract words ( $r(73) = 0.20$ ,  $p = 0.09$ ), indicating that the method of analysis was not the crucial factor. If others were interested to persevere with this protocol then perhaps they might be advised to consider potential correlates other than those investigated here, for example schizotypy, which has some evidence in support of a relationship with psi task performance (Lawrence & Woodley, 1998; Simmonds, 2002).

In conclusion, then, although intuitively plausible, there is little empirical support for the suggestion that the process utilised here to induce false memories can provide a fruitful medium for studying ESP. Of course, this does not imply that other forms of false memory generation need necessarily be similarly unpromising.

#### ACKNOWLEDGEMENT

I gratefully acknowledge the support of the SPR Research Grants Committee, which enabled me to carry out this study.

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# REFERENCES

- Blackmore, S. and Rose, N. (1997) Reality and imagination: a psi-conductive confusion? *JP* 61, 321-335.
- Carlson, E. B. and Putnam, F. W. (1993) An update on the Dissociative Experiences Scale. *Dissociation* 6, 16-27.
- Dalton, K., Steinkamp, F. and Sherwood, S. J. (1999) A dream GESP experiment using dynamic targets and consensus vote. *JASPR* 93, 145-166.
- Garry, M., Loftus, E. F. and Brown, S. W. (1994) Memory: a river runs through it. *Consciousness and Cognition* 3, 438-451.
- Greening, E. (2000) Belief in the paranormal and false memory. Paper presented at the Society for Psychical Research 24th International Conference, University College Northampton.
- Greening, E. and Wiseman, R. (1999) ESP and false memory: a pilot study. Paper presented at the Society for Psychical Research 23rd International Conference, 3rd-5th September, 1999, St Chad's College, University of Durham.
- Hartmann, E. (1991) *Boundaries in the Mind: A New Psychology of Personality*. New York: Basic Books.
- Hirshman, E. and Arndt, J. (1997) Discriminating alternative conceptions of false recognition: the cases of word concreteness and word frequency. *Journal of Experimental Psychology: Learning, Memory and Cognition* 23, 1306-1323.
- Lange, R., Thalbourne, M. A., Houran, J. and Storm, L. (2000) The revised transliminality scale: reliability and validity data from a Rasch top-down purification procedure. *Consciousness and Cognition* 9, 591-617.
- Lawrence, T. R. (1993) Gathering in the sheep and goats: a meta-analysis of forced-choice sheep-goat studies, 1947-1993. *Proceedings of the Parapsychological Association 36th Annual Convention*.
- Lawrence, T. R. (1995) Moving on from the Paranormal Belief Scale: a final reply to Tobacyk. *JP* 59, 131-140.
- Lawrence, T. R. and Woodley, P. (1998) *Schizotypy as a predictor of success in a free response ESP task*. Paper presented at the Society for Psychical Research 22nd International Conference.
- Mavromatis, A. (1987) *Hypnagogia: The Unique State of Consciousness Between Wakefulness and Sleep*. Routledge & Kegan Paul.
- Parker, A. (2001) A review of the ganzfeld work at Gothenburg University. *JSPR* 64, 1-15.
- Perez-Mata, M. N., Read, J. D. and Diges, M. (2002) Effects of divided attention and word concreteness on correct recall and false memory reports. *Memory* 10, 161-177.
- Rose, N. and Blackmore, S. (2001) Are false memories psi-conductive? *JP* 65, 125-144.
- Simmonds, C. A. (2002) *Investigating Schizotypy as an Anomaly-Prone Personality*. Unpublished PhD thesis, University of Leicester.
- Simmonds, C. A. and Roe, C. A. (2000) Personality correlates of anomalous experiences, perceived ability and beliefs: schizotypy, temporal lobe signs and gender. *Proceedings of the Parapsychological Association 43rd Annual Convention*, 276-291.
- Storm, L. and Thalbourne, M. A. (1998-1999) The transliminal connection between personality and paranormal effects in an experiment with the I Ching. *EJP* 14, 100-124.
- Thalbourne, M. A. (2000) Transliminality: a review. *IJP* 11, 1-34.
- Thalbourne, M. A. and Delin, P. S. (1993) A new instrument for measuring the sheep-goat variable: its psychometric properties and factor structure. *JSPR* 59, 172-186.

Thalbourne, M. A. and Houran, J. (2000) Transliminality, the Mental Experience Inventory and tolerance of ambiguity. *Personality and Individual Differences* 28, 853-863.

Tobacyk, J. (1988) *A Revised Paranormal Belief Scale*. Unpublished manuscript, Louisiana Tech. University, Rushton, LA.

APPENDIX

Version 1		Version 2		BOTH
With pictures	Words only	With pictures	Words only	Dummy words
Achievement	Apple	Apple	Achievement	Drum
Auction	Astronaut	Astronaut	Auction	Garage
Baby	Celebration	Celebration	Baby	Scorpion
Car	Chair	Chair	Car	Charity
Clock	<i>Frustration</i>	<i>Frustration</i>	Clock	Table
<i>Denial</i>	<i>Idea</i>	<i>Idea</i>	<i>Denial</i>	Flower
<i>Education</i>	<i>Justice</i>	<i>Justice</i>	<i>Education</i>	<i>Friendship</i>
Guitar	Lawnmower	Lawnmower	Guitar	<i>Work</i>
Harmony	<i>Old-fashioned</i>	<i>Old-fashioned</i>	Harmony	Bicycle
House	<i>Religion</i>	<i>Religion</i>	House	Nurse
<i>Love</i>	Ship	Ship	<i>Love</i>	<i>Emotion</i>
<i>Magic</i>	Snake	Snake	<i>Magic</i>	<i>Disarray</i>
<i>Nuclear</i>	Teamwork	Teamwork	<i>Nuclear</i>	
Spider	Trumpet	Trumpet	Spider	
Tree	War	War	Tree	
Wheel	Windmill	Windmill	Wheel	